

DESKTOP VIDEO: Zooming Into The Future

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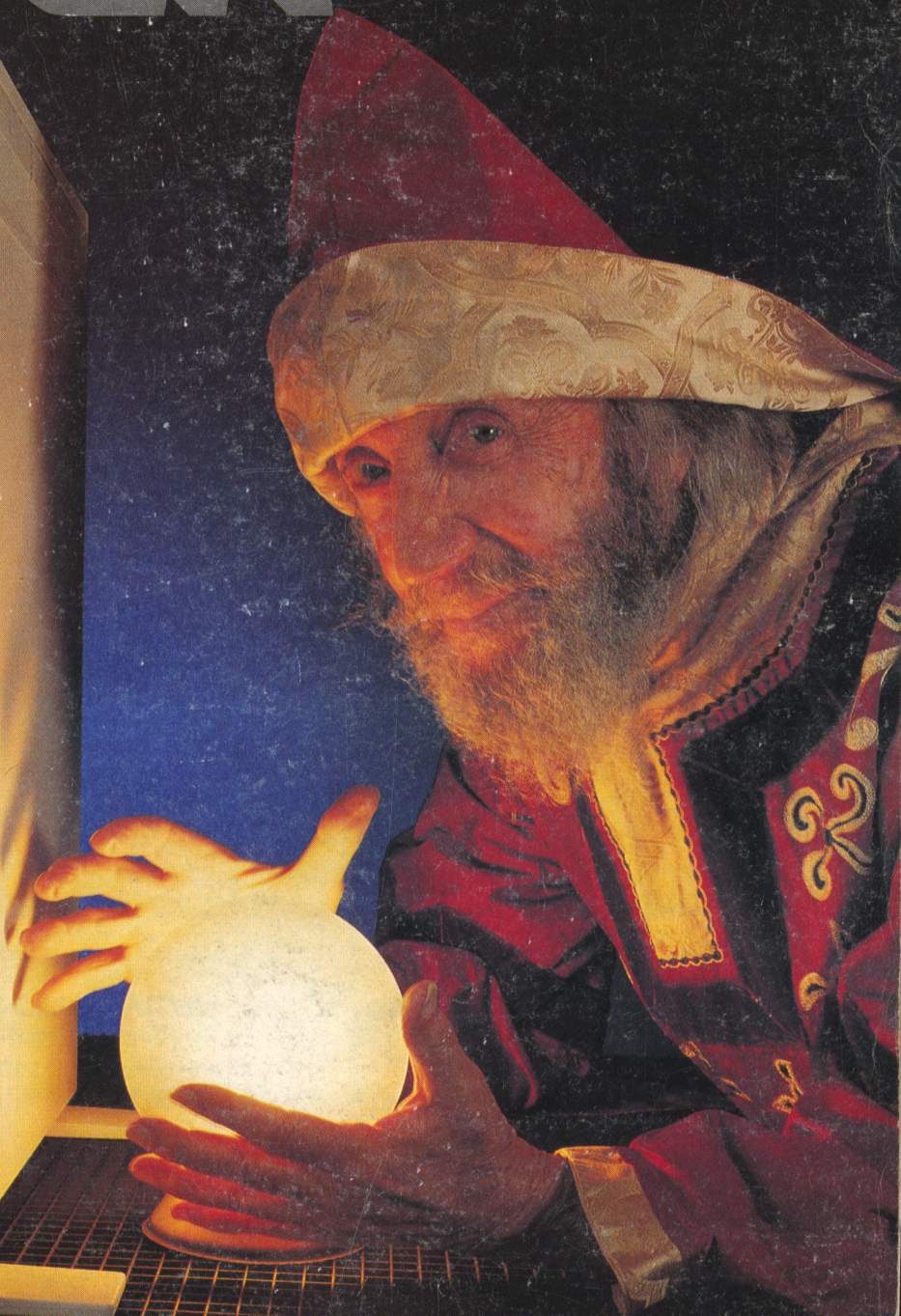
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Atari ST Outlook Atari Plots A Parallel Course

by D. F. Scott

This is the first in a series dedicated to new concepts in computing, and how Atari and its supporters are bringing these concepts into reality. We'll be talking to Atari corporate executives from time to time, as well as sources outside the company. Most importantly, we'll show you the people involved in Atari computing; and you'll see their opinions and arguments in their words. The facts presented in these pages will be documented and backed up by responsible sources, not rumor-mongers. We hope you'll join us for the Outlook in *Computer Shopper* every month. This month, we shine a spotlight into the next four years of microcomputing—years which could have us thinking in parallel.

The ST is Taken ABAQ

The case has been argued that hardware technology has recently advanced so rapidly that the new, "state of the art" computers become obsolete before software engineers can decide what to do with them. Such a story can be told with relation to Atari. Shiraz Shivji, its vice president for Engineering and Development, is continually developing new prototype computers and peripherals utilizing whatever new, ground-breaking machine architecture has been developed that particular week. Last year at this time, his team had a working prototype of a 68020-based UNIX board which plugged into a 520/1040ST through the DMA port. Then there was the 68881 coprocessor for the ST, followed by the small-scale EtherNet-like networking contention scheme. Just a few months ago, the exciting sounding word RISC (Reduced Instruction Set Computer) was heard echoing from Atari's labs—a new way to make the same computer run faster merely by altering its instruction set mnemonics. In the meantime, Atari's Sig Hartmann and Richard Frick have been meeting with hundreds of potential developers in search of the software package that would, by itself, sell the ST—what Jazz was supposed to be for the Macintosh. It sometimes seems what Hartmann's software team is trying to make work and make sell, Shivji's hardware team is trying to replace. But Atari doesn't want to be known as the company that produces last year's new technology. Even in technological circles, 68020/68881 RISC networks are beginning to sound antique. Atari, now fully afloat, wants to spearhead the next major technological wave. Yet as the computer trade press is so eager to point out, the last three waves have passed Atari by. Besides, how can the buying public possibly listen to Atari's fanfare if they don't know the company's still around? The "Business is

War" ad campaign was designed not only to put Atari's name back on the map, but back in consumers' minds; yet network television thus far displays none of Atari's cannonfire. The Atari PC—another consumer re-education effort—has yet to materialize; and frankly, many of us wouldn't mind if it never did. Meanwhile, back in the labs, Shiraz Shivji and his group have a plan: Assemble a machine so far ahead of its time, that by the time software has been adapted to make that machine applicable, the machine is still new. This time, Engineering and Development has found a device introduced in technological journals just seven months ago. It's called the Transputer, it utilizes a concept called parallel processing, and its very first vehicle into the mass market may very well be the Mega ST.

Inside The Transputer Room

Next time I visit California, if I have the choice of seeing either Atari's laboratories or Disney's Tomorrowland, I'd gladly choose the former.

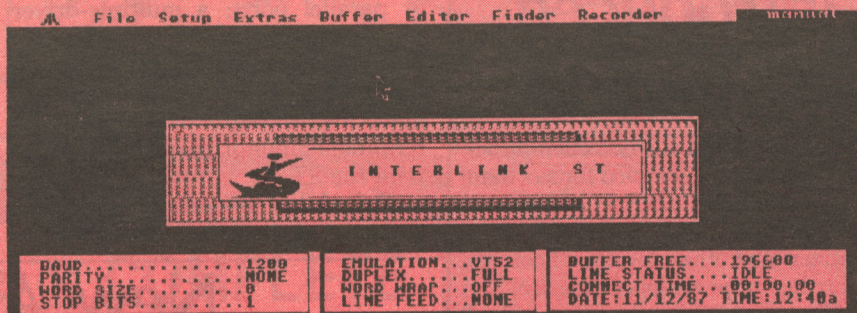
What goes on there is a much more realistic foretelling of what is to come. The labs' key project is currently a parallel-processing workstation called ABAQ (pronounced "Ah, Bach!") based on a CPU called the T800 Transputer. This device is manufactured in Colorado Springs by Inmos, a British firm headquartered in Bristol England—whose parent company is Thorn-EMI, an electronics and media conglomerate. Shiraz Shivji introduces us to ABAQ: "Here's how it's going to be working: I don't believe anybody would argue that the Transputer is a very fast processor, which is very useful for number-crunching and so on. You let it do the number-crunching, and let somebody else do the I/O—you don't want to waste all this horsepower on worrying about interruptions, and all those little things. The system is designed as follows: The first unit will be available as an add-on to the Mega machine. You plug in a card inside the Mega box, and that has something called a link which runs at 20 Mbits/sec; and it also has a SCSI

controller, so the SCSI port is actually controlled through the 68000. Of course, you have a lot of local memory for caching, and what have you.

"There's a big box—well, 'big' is relative, actually it's fairly small compared to AT-type boxes, but it's a big box—that has a large power supply, a Transputer motherboard with 4 Mb of memory plus 1 Mb of video RAM. There's also a video processor built into this unit. And it has slots, so the base unit also has a lot of room for a large hard disk, and the power to supply it. You can plug in cards; one of the cards that we will have will be a card that has four Transputers, and the links for them too. One of the cards we will have to demonstrate will have four Transputers on the card, plus the local memory for the Transputers. Each Transputer will have its own local memory. The links will be available to connect to the Transputer, which is down on the main board, plus between

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A New Program For ST—Interlink ST



by Randy Holcomb

As the Atari ST matures, so does the base of one of the more critical areas of computing, namely modem-based communications. In the past months we have seen several new and upgraded communications programs for the ST: Flash, Interlink ST and (soon-to-be, if not already released) ST-Talk Professional. I have been using Flash for quite a while and have become reasonably comfortable with it, but when compared to other PC/Clone packages I was hoping that someone would have some insight and not back themselves into a corner and allow for more flexibility in "bolting on" new terminal emulations, file transfer protocols, etc. Each vendor in the ST market took different routes: in the case of Flash, the authors made additional features via a desk accessory. Randy Mears, the author of Interlink

ST, took what I consider to be a more adaptable and virtuous approach: create "hooks" which the user can dynamically switch in and out, and don't touch the main body of the package, and attempt to make the product as easy to use as possible.

I can happily say, with some minor reservations, that Interlink ST is a very good product which has the potential of becoming a "ST Standard", by which all other products will be judged against.

Getting Started. Interlink ST relies heavily on GEM for setup and configuration, and also implements many function keys to handle most-often required operations. If you have used Flash for a while, getting used to the function/alternate key mapping will take some retraining to do: Whereas Flash uses ALT-S (send file) and ALT-D (receive file) for file transfer, Interlink uses ALT-U for upload and

ALT-D for download. Different semantics, different key-mappings!

Invoking Interlink ST, as delivered, places you into a recorder file which is auto-invoked on startup (We'll tackle recorder files later) which you can abort out of by clicking the right-mouse button. What you get is a main display which provides useful information on your current status (Figure 1.) Hitting the right-hand mouse button kicks you into the terminal mode with status line.

On an operational basis, Interlink ST relies more on GEM than Flash does in collecting the necessary information to carry out a task: this can be either good or bad depending on how much you like or hate GEM dialog boxes and file selector menus. In fact, Interlink doesn't use what you normally consider the "Standard" file selector box. It has a very unique box (if just a tad bit clumsy to maneuver with at times).

Where Interlink Shines is in its use of "Loadable" terminal emulation and file transfer modules, built-in remote access capability, program execution under Interlink control and the session recorder. On the dialog boxes that contain the selection of what kind of terminal you are emulating and on the file transfer dialog box are buttons which contain three question marks—"???" . When you click this box on, you

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DeskCart—A Bunch Of Useful Tools

by D.F. Scott

To review a package of microcomputer tools would be a task similar to giving performance and aesthetic appearance ratings to a bunch of hammers, wrenches, and screwdrivers. Unto themselves, micro utilities are extensively and exhaustively boring as heck—what can one say about a printer spooler compared to some other printer spooler? What's fascinating about such utilities is how they were made—forged, shall we say. People who are good with tools tend to collect them, usually for rather personal reasons. This is the story of one such collection, and the people who forged them.

John S. DeMar is the president of Quantum Microsystems, Inc., and was the leader of the project to produce DeskCart, the first mass-produced memory-resident utility cartridge for the Atari ST. Until now, there have been all-in-one software-based accessory packages such as MichTron's Cornerman; but those big packages took up so much memory on a 512K 520ST that some major space-consuming programs were rendered unusable. The purpose of DeskCart is to put as much of its memory-resident code into ROM as possible.

The DeskCart package contains 14 accessory selections, 13 of which are on the cartridge itself. These 14 are all selectable through one accessory slot, since the ST's GEM portion of the TOS

operating system only provides six slots. The cartridge also contains one vital necessity the ST itself doesn't provide: a battery backed-up clock, which is integrated into the code structure of DeskCart in such a way that unauthorized duplication becomes impossible.

In the initiation of such monumental projects as this, the principal authors generally meet each other through strokes of luck, or synchronistically. They may find their brains have been operating on the same wavelength—and even at the same frequency. In this case, DeMar and co-author Robert Dolan were former colleagues at Xerox until about 1980 when they both left the company. In June of 1986, the two spotted each other's username on a Rochester, NY electronic bulletin board; and when DeMar drove from his home outside Syracuse to meet with Dolan, they discovered they had both been writing extensive notes on exactly the same project: an accessory cartridge.

I talked with John DeMar, who described the situation that befell them: "We had no idea how to program the thing at that particular time. We were both just getting pretty good at GEM programming. We didn't look at anybody else's software, we didn't look at a Mac, we didn't look at SideKick. I had never seen SideKick at all until a month ago; I never even booted it.

"We sat around and made some notes. A lot of the stuff we talked about never made it in there, because of the size—64K of ROM. Then I thought of another guy, Richard Gortatowsky, who was a pretty good programmer. We found out [Richard and Robert] had never met each other, and they live two blocks away from each other. We divided up the functionality three ways; and we all went off doing our own thing, with guidelines [on] naming conventions. I never worked on a project where I had to merge somebody else's code into mine. I could be as sloppy as I want, uncommon as I want, and pick any name for variables. This was an interesting project, because we had to try to keep some conventions."

The 14 accessories the trio agreed upon were these: a calendar with alarm clock and appointment book which will remind the user of important times and events up until the year 2040; a small text editor in the form of an electronic notebook; a card index file; an address/phone number database; a simulated typewriter which sends a line of output directly to the printer; a keyboard macro system which allows several characters to be typed at the touch of two or three buttons, or engages a DeskCart accessory in the same way.

Also: a programmers' calculator with hexadecimal/octal/binary modes and 100 memories; a size-selectable RAMdisk; a 9-sector-per-80-track disk formatter with status checker; a user-configurable printer spooler for serial or parallel ports; a multiple-driver printer screen-dump device, with vertical and horizontal print modes; a RAM integrity tester; and replacements for the control panel and VT-52 terminal emulator normally supplied with the ST.

"I had the responsibility," states DeMar, "of designing the hardware,

and merging all the programs to work together. The concept of how the user interface works—the drop-down menu, and pretty much what every function looked like—was all my design. The Calendar, Notebook, and Calculator were Bob Dolan's work. Anything that's a database—the Card File, the Address Book, the Appointment Book underneath the Calendar—that's Rick's stuff. The Print Spooler is Rick's stuff. The rest of it is mine."

Since most of DeskCart's program code is in ROM, the responsiveness of many of its features is refreshingly instantaneous. Atari's VT-52 emulator consumes about 15K of the CONTROL.ACC accessory program; although DeskCart's version consumes only a trifling of user memory. It actually does read the keystrokes a DEC terminal by that name normally would; the Atari implementation for some reason forgot the importance of the Escape key.

Yet DeskCart does consume some memory—and I'm using the word "some" here as in "Some of the Earth's surface is land" and "Some of my sentences run too long." Memory consumption is, in fact, the major controversial issue related to the use of DeskCart; and it raises some equally controversial questions concerning the software design of the ST itself.

First, some background: In the C programming language, there is a command called malloc, which is short for "memory allocation." This tells the computer's Memory Management Unit—or whatever suffices for one—to allocate a memory block for use by a program or process. This allocated block would have a "handle," or a number specific to that block, so that when the command free with that handle is encountered, that

continued on page 326

drafix 1 CAD Introduced For Atari ST Computers

drafix 1/Atari ST, a new version of the popular drafix 1 high performance, low cost Computer Aided Design and Drafting program previously available only for IBM compatible computers, has been introduced by Foresight Resources Corporation. Suggested retail price is \$195.

drafix 1/Atari ST includes all the features which have made drafix 1 one of the best selling CAD programs in the IBM PC environment. drafix 1 includes a unique Dynamic Screen Menuing System that continuously displays commands, for fast operation, elimination of memorization and ease of learning. The program offers all the power and flexibility of professional CAD software costing many times more, including comprehensive entity drawing and editing facilities, advanced snap, grid and object snap drawing aids, multiple fonts, cross-hatching, a complete automatic dimensioning system, symbol library management and much more.

"drafix 1/Atari ST is the first professional quality CAD software available for the Atari 520ST and 1040ST computers," commented Dr. Larry Pfortmiller, Foresight's vice-president of Product Management. "A complete

CAD workstation with excellent functionality can be assembled for less than \$1,000. A drafix 1/Atari ST system can also include hard disks, plotters, digitizers and other devices, of course, to further improve performance."

"The Atari ST line has always had a graphic orientation," Dr. Pfortmiller continued, "and Atari users should feel right at home with drafix 1/Atari ST's advanced graphic interface. drafix 1/Atari ST also continues the Atari tradition of combining superior performance, ease of learning, simple operation and low cost."

Reviewers have acclaimed the PC version of drafix 1's features and performance. For example, *PC Magazine* raved about "the best user interface on any CADD," and *Computer Currents*, *Architecture*, *On Line Today* and other publications have endorsed the programs' outstanding value and performance.

drafix 1/Atari ST runs on Atari 520ST and 1040ST computers in either monochrome or color, using a wide variety of video, mice, digitizers, printers and plotters.

For more information contact Foresight Resources Corp., 932 Massachusetts, Lawrence, Kansas 66044; (913) 841-1121. •

New Atari ST Releases From Abacus

Abacus has announced two new products for the Atari ST.

BeckerText ST has features found in other standard word processors. But BeckerText ST adds many unique features that make word processing even more complete: ability to include graphics within a document, set and use decimal tabs, perform auto hyphenation and indexing, spell check in real time as you enter text, type lines containing up to 999 characters, perform numeric calculations within a document. BeckerText ST includes the ElectraSpell spell checker with an expandable 40,000+ word dictionary.

BekterText ST will be available to ship in December. The suggested retail price is \$99.95. Upgrades from Text-Pro ST are also available. Contact Abacus for details.

Abacus also has announced the release of a new book title.

GFA BASIC has been widely acclaimed as a better way to program the powerful Atari ST series of computers. This is due mainly to the rich features of the GFA BASIC language and the availability of the GFA BASIC compiler.

Abacus' *Quick Reference Guide to GFA BASIC* is for the user who wants a concise and handy reference to the dozens of important elements of this powerful language. It contains the complete syntax and description of the GFA BASIC commands in a compact format.

The book will be available in January 1988. 200 pages. ISBN 0-916439-90-9. The suggested retail price is \$14.95.

For more information, contact: Abacus, 5370 52nd Street SE, Grand Rapids, MI 49508, (616)698-0330. •

CLASSIC COMPUTERS

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geoSynch: Fear And Loathing With geoCalc

by D. Roderick Eamon

Warning: Do not install geoCalc on GEOS 128! Due to its heavy use of BASIC ROM, geoCalc won't run at the Commodore 128's 2MHz clock speed.

Work on the geoCalc 128 proceeds but its shipping date hasn't yet been announced. An upgrade will be offered for a modest fee when the final version of geoCalc 128 is released.

Now, on to the subject of this month's column: the C-64 version of geoCalc. That, and my own fear of any math more complex than simple algebra.

Today, they call this fear math anxiety. A lot of us—even computer users—experience it. Its cause, a poor grounding in the under-pinnings of math's higher orders. You know us: we're the ones who wait until month's end (if ever) to balance the checkbook. We eye with envy those who easily create workable budgets...and stick with them. We math anxious never seem able to keep up with the saber-edged surprises real-world math hurls our way.

The sad truth: math anxious people unconsciously imagine math as far more difficult and illlogical than it really is (Source: gifted wife with B.S. in Math & Engineering, and an A.A. in Social Science).

High school factors (far-sighted/astigmatism, optometrist who didn't believe in glasses, mumbling teacher, back-row desk) tempered me into the math anxiety case I am today. It's among the few mementos left over from my salad days.

When geoCalc arrived from Berkeley Softworks (this is an "add-on" application that runs under the GEOS deskTop and Kernal, Version 1.2 or later), my angst level went critical. My throat constricted, pulse quickened, and normal iron will deserted me. I sensed a sudden urge to rush off and read Joyce's *Ulysses*.

It was a familiar old queeziness. "Moderate cases of math anxiety," I told myself, "don't get sudden urges to read *Ulysses*!"

"Use your fear," my inner voice continued, "work with it, channel it." Yeah, the Little Engine that could. So, my resolve steeled to defeat M.A., I filed forward with geoCalc at the ready! If slaying numbers terrifies you, remember this: if I can survive, you can too. Now, to it.

GeoCalc: For The Squeamish?

For those who have never used but

are considering a spreadsheet purchase, a primer:

Spreadsheet programs present an image that looks like a sheet of paper divided by lines into rows and columns. They look for all the world to be a leaf torn from a bookkeeper's ledger. And that's precisely what spreadsheets are...electronic ledgers.

Spreadsheets are rigidly designed programs, consisting (by number and letter, respectively) of "cells" where text, numbers, or formulas are placed. These cells have identities given them by their location, much like street addresses, denoted by the row and column they occupy. Example: the uppermost left cell on a spreadsheet is "A1."

The information placed in cell A1—call it a cross reference—can be used by any number of other cells in the spreadsheet, by referring to A1 within a formula or command. The ability to transfer data and link formulas between cells is a spreadsheet's real power.

That said, let's look at Berkeley Softworks' program, geoCalc.

In line with the above definition, geoCalc is a spreadsheet, a large sheet. geoCalc spans a surface 112 columns wide by 256 rows long. Simple multiplication tells us the sheet to be a collection of 28,672 rectangles or cells.

Because of its familial resemblance to the other GEOS programs, geoCalc proved effortless to manipulate. It was friendly to open and look at.

Perhaps this point-and-click simplicity is the key. No matter what GEOS program you use, you will never feel estranged on a strange world.

On the down side, unlike the basic GEOS applications (i.e., geoWrite and geoPaint 1.3), geoCalc requires more than the standard dollop of study to master.

geoCalc sports an array of functions not found on some of the most expensive spreadsheet programs. A certain unnamed mathematician/engineer rated geoCalc over Lotus 1-2-3 in the "user-friendly" department and found the math, stat, financial, scientific, trig, and derivation functions impressive. Strong words from one jaded by 16 and 32-bit machines.

Documentation

The manual is concise if at times confusing; I spent two days mulling over the difference between absolute and relative cell references before it finally dawned on me.

Once beyond such alien basics, the manual's lead-you-by-the-hand approach instills confidence, even among MAs like myself. Chapter 3 is a must. In particular, I appreciated Chapter 4: its in-depth explanation of formula construction, worksheet shortcuts, and built-in functions. The index is a model other software houses should emulate and the Dictionary of Terms was adequate.

Granted, geoCalc isn't exactly a breeze to understand, but then what truly powerful spreadsheet is?

Up And Running

Read the manual. Install geoCalc. Generate a back-up copy. Read the manual. Create a work disk. Read the manual. While not so simple as other GEOS documentation, patience pays off here...trust me.

Create the Worksheet 1 example. If you've never used a spreadsheet before, it takes a few hours of roaming around geoCalc's environment until you're at ease with its functions,

commands, and options. Building Worksheet 1 helps you learn geoCalc's tricks.

Now, open your work disk. The reassuring deskTop screen that appears sports three new Icons: geoCalc and New Car (the sample spreadsheet Berksoft included), and the Worksheet 1 file you created in the manual's third chapter.

You now own two files; what can you really do with them? New Car doesn't really reflect the reality of buying a car in today's rebate/low interest world, while the second file, Worksheet, is fine for demonstration but useless as a business or household budget.

To help the rest of us, I revised these into two new spreadsheets:

How Much? (Figure 1) handles the interest/rebate question if said rebate is applied to a car's purchase price. To help you recreate the spreadsheet, I've

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ATARI

Applying The Atari

by Jeff Brenner

Happy New Year, readers! And now for the big annual question: What does 1988 hold in store for the many new 8-bit Atari owners, the occasional 8-bit "word processing" users, the faithful 8-bit users' group attendees, and the die-hard 8-bit hackers? Are the 8-bit machines destined to become closet ornaments, or to face death by starvation as the software supply shrivels up? Are 8-bit owners dumping their hardware and software investments and running out to get hold of an ST (preferably a new Mega-ST)? While the 8-bit owners scream "No!" to these questions, many magazines and software manufacturers (and maybe even Atari Corp. itself) seem to believe that the 8-bit is gone for good. Never mind, say 8-bit owners, that unlike "orphan computers" or discontinued models, three 8-bit models are still being sold on store shelves this very day; namely the 65XE, the 130XE and the new XE game machine. Never mind that the 8-bit Atari community gained thousands of brand new members over this holiday season. And never mind that overseas the 8-bit Atari computers are still the most popular machines in several countries.

While there has most definitely been a decline in software and hardware support for the 8-bits as the STs have been gaining popularity, and while magazines such as the *Atari Explorer* have been dropping 8-bit pages as fast as they can put in ST pages, the situation for 8-bit owners is far from

hopeless. Many new releases for the 8-bit Atari have appeared over the past few months (see last month's holiday column for a listing) and several manufacturers continue to release 8-bit Atari versions of programs. At this writing, for example, I received the home version of the arcade game Gauntlet, from Mindscape, for the XL/XE, and PaperBoy is also due for release for the 8-bit. (Reviews will be forthcoming in *Computer Shopper*.) As far as 8-bit information goes, *Computer Shopper* continues to support the 8-bit, being one of the only magazines among the top ten (by circulation) computer publications to do so. And *Antic* and *ANALOG* magazines, which have spun off independent publications for the ST computers, have continued to maintain a consistent balance of 8-bit and ST content, without the appearance of ST domination.

Well, enough talk about theoretical 8-bit computer doom. Let's instead think positively and look towards the future. The new XE game machine promises to bring back the attention of some software makers to the 8-bits, and the strength of the 8-bit community will assure that the 800, XL and XEs are not soon forgotten. And with that said, let's move on to some reader mail.

Reader Mail

Dear Jeff:

Would you please set the record straight? I own an 800XL and a 1050

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TEXAS INSTRUMENTS

TI Forum continued from page 188

Jim, we still miss the challenges, the one-liners, and the programming tutorials. Enjoy the fishing and may your line always be taut with one that can't get away. The meteoric life of the "Gram Kracker" from MG was another sad passing. Bursting on the scene as the first device to allow the user to reprogram the entire console chip set and cartridges as well, including GROM-based ones, the ingenious "Kracker" shot into the TI marketplace with a flurry of activity

and hacking. Then, due to rising chip prices and other concerns, the little wonder was taken out of production. The hopes of many that its production would be picked up by another firm have remained unfulfilled. But, for that one brief moment, the "Kracker Hacking" was thrilling to watch, as the "innards" of the whole 99/4A machine was opened for all the world to see and change.

1987 was a shakeout year for the /4A user. The predictable decline in

numbers of machines in use was compensated for by the activity and productivity of those that remained. There is a sense of watchful anticipation on the future development of Myarc's Geneve. If the TI community is to receive an infusion of new users, there must be a major upgrade. If its potential is nurtured, the Geneve may fill that role.

Starting 1988 With A Bang!

To give 1988 a proper start, the annual "TI Fest West" will kick off the New Year with a new location and an extended schedule. According to John Martin of the Southern Nevada User Group ("SNUG"), this Fest West

(dubbed "TI-XPO-88") will be held in Las Vegas on February 27 and 28 at the Palace Station Hotel and (get this!) Casino. Planned are guest speakers, hardware and software demonstrations, a programming clinic, door prizes, and more. The XPO organizers are doing it up right by providing reduced rates for rooms at the Palace (\$42/night for single or double occupancy) and reduced fares on Pacific Southwest Airlines to and from Las Vegas. It should be a blast. It is my understanding that the XPO is being cosponsored with the Los Angeles User Group and that group's expertise will

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ATARI

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disk drive. I want to hook all my computer components to one main power switch so that I can turn everything on with one flick of a switch (all the power switches of each component would be left "on"). This would mean that I would need to place my disk in the disk drive before I turn the power on, or else the computer would start—"BOOT ERROR...BOOT ERROR...BOOT ERROR" etc. Now my question: I have heard conflicting stories that it is either safe, or unsafe, to turn the power on when a disk is in the drive. What's the story? My friend swears that she destroyed a disk by doing just that. At work, though, I've been doing that for years with no problems. I would appreciate your advice.

S. Markman
Norfolk, Virginia

Leaving a disk in an Atari 810 or

1050 disk drive and turning the power on and off is NOT RECOMMENDED. Atari drives (as well as some others) when turned on or off often send enough of a surge to the engaged read/write head to damage a portion of the disk. Whether or not the diskette will then be usable depends upon how much of a surge the read/write head received and the location of the head with respect to the disk when the power is turned either on or off. I have received numerous letters from readers who have suddenly found one of their diskettes or a commercial diskette wouldn't load, and in many cases these readers admitted to leaving diskettes in the disk drive. Also, I have personally had programs damaged or destroyed after power outages. The disk does not need to be spinning or "busy" for damage to occur (although losing power when

the drive is writing is almost certain to be damaging).

You can go ahead and plug all of your components into one power switch, but just be sure the disk drive is on before you insert your diskette, and not vice versa. Even if the screen begins to show "BOOT ERROR" (when the power switch is initially turned on and the drive has no diskette in it) you can insert your diskette at this point and it should commence to load normally. Better yet, continue to use the power switch on your computer in addition to your main power switch (which would send power to your disk drive, printer, modem, monitor, etc.), insert the diskette into the drive and then turn on the computer itself. This practice may even make it more convenient or easier to remember when you have to hold down the OPTION key.

Dear Jeff:

I sent for and received information for the Ramcharger from Future Systems (formerly Indus). I am still deciding whether or not to buy it. I have not seen any reviews on the Ramcharger. I would like your opinion of Ramcharger. (The Ramcharger is a CP/M emulator for the 8-bit Atari computers with Indus disk drives.)

Cal DeGroot
Rock Falls, Illinois

I have not used the Ramcharger, but if any readers are using the product and want to comment on it, I'd be glad to lend some column space.

Newsletters

The PACUS Report is the newsletter of the Packerland Atari Computer Users Society (\$15/yr, 2714 South Eleventh Place, Sheboygan, WI 53081.) The October 1987 issue contains an informative article on the features and bugs of the Atari BASIC, a player/missile graphics tutorial, game reviews, and an article on SPRITES in GFA BASIC for the ST.

RUNES is the newsletter of the Midwest Atari Group, Iowa Chapter (\$15/yr, P.O. Box 1982, Ames, IA 50010-1982.) The September issue contains Atari news, a review of Ace of Aces, and an article on a 1050 repair.

The September 1987 issue of JACG, the newsletter of the Jersey Atari Computer Group (\$25/yr, 8 Crescent Road, Pine Brook, NJ 07058), contains game reviews, Atari news, a review of the

UPRINT interface/buffer and a light-pen project.

The Sourcerer's Apprentice is the newsletter of the MAGIC, the Michigan Atari General Information Conference (\$15/yr, 28111 Imperial Drive, Warren, MI 48093). The August 1987 issue contains a machine language string utility, articles on choosing software and on Atari controllers, plus ST section.

The September 1987 issue of POKEY, the newsletter of the Western New York Atari Users Group (\$15/yr, P.O. Box 59, Buffalo, NY 14216) contains a tutorial on ACTION!, and book and software reviews.

Hard Disk Newsletter

The Hard Disk User Group newsletter is a unique publication for 8-bit and ST owners who use hard disk drives (\$18/yr, quarterly issues, Network: HDUG, 5831 Sun Bay, San Antonio, TX 78244). The October 1987 issue (volume II) contains articles on ICD's "ST Host Adapter," interviews with BBS Express' professional author Keith Ledbetter and Z-Magazine editor Ron Kovacs, a hard disk question and answer section, and a comparison of 8-bit BBS software. The hard disk advertisements are interesting as well.

Daisy-Dot II

The Command Headquarters BBS, ([216] 758-0284) has improved upon Roy Goldman's Daisy-Dot program to produce Daisy Dot II, an even more exciting public domain printer utility. Daisy Dot II lets you print in near-letter-quality with your Epson, Gemini, ProWriter, or compatible printers and supports underlining, double width, incorporating picture files, using multiple fonts, etc. See Figure 1 for a sample printout.

Next Month

We'll have more reader mail, Atari news, and some surprises, too. Stay tuned.

Readers' questions, comments and contributions are welcome. Please enclose a self-addressed, stamped envelope for a personal response. Due to volume of mail, only a selected number of personal responses can be answered each month. Address all correspondence to: Jeff Brenner, "Applying The Atari 1/88", c/o Computer Shopper, P.O. Box F, Titusville, FL 32781.

more Atari follows on page 368

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Figure 1

Atari ST Outlook continued from page 322

the links between each one of the Transputers."

Most of us are familiar with the concept of coprocessing, in which a floating-point arithmetic coprocessor can be attached to the CPU of a computer, and complex math functions like division (for a computer, that's complex) can be rerouted, or vectored, into the math coprocessor (often abbreviated to MCU). What we call "coprocessing," the designers call "vector processing." The MCU can be performing math while the CPU performs system control and memory-related operations, both using the same clock cycles. Since an MCU by nature is faster at math than a CPU—all the MCU does is math—the overall machine speed more than doubles.

A parallel processing chip, curiously enough, is its own coprocessor. Within it there are several compartmentalized nodes, much like the nodes of processors in a computer network yet on the same chip—not different machines. Each node could function quite well as a separate computer. It has its own arithmetic logic unit, its own set of registers, and its own memory—1 Mb per node.

The object code for the Inmos Transputer, like for any other chip, is one long stream of instructions—not four or more streams sitting side-by-side. The Transputer contains a special processing mechanism which recognizes the various integral modules and routines in the object code and apportions each module to different nodes, however many nodes there may be in the system. Each node is connected to the other through 12 sublinks which are 32 bits wide, and are linked to communications channels in the outside world through four sublinks. Each node also contains eight separate processors, each with its own job—local memory control, I/O, device access, and arithmetic logic, for instance. The latter uses a vectored

processing stream which is literally 64 bits wide.

As Shiraz Shivji describes it, "You have a very fast floating-point capability which is on the order of 1.5 megaflops—which is 1.5 million floating point operations per second—which is a very, very exciting thing."

A RISC We Have to Take

The Transputer is considered a RISC chip, since its instruction set is small, and most instructions are only eight bits long. In order to keep up with the speed of the nodes' combined output, the T800 purposefully gets ahead of itself, utilizing an instruction pre-fetching buffer comprised of extremely fast (18 ns) static RAM holding eight instructions in advance of the current one on the execution stack, before vectoring instructions to the individual nodes. Static RAM (SRAM), although fast, isn't meant to contain data for sustained intervals like slower dynamic RAM (DRAM)—our STs contain 120-nanosecond DRAMs.

The remainder of user memory, although localized to 1 Mb per node, is comprised of DRAM whose addresses are all sequentially numbered, so that there are no two addresses numbered alike. The theoretical maximum amount of RAM the T800 can address is 4 Gbytes, or four billion bytes—which would make the final memory address, in hexadecimal, 0xFFFFFFFF.

Perhaps the most important achievement of Transputer architecture is its inherent stackability. As we mentioned before, a Transputer is its own coprocessor. Therefore, if a node configuration is, for some reason, just too slow or not powerful enough, the user may simply add more nodes.

Shiraz Shivji: "There's a standard card that Inmos is selling which has four Transputers. That's quite a standard configuration in the Transputer world. But there are switches on the board, and each board has this connection coming out, like a 9-pin con-

ductor. You have something like patch cords—in the old days of analog computers, you had these patch cords you could plug from one op-amp to another to do all kinds of things. With the patch cords you can connect different boards with different kinds of Transputers in different configurations. That's the bare-bones part."

The arrangement of nodes in a Transputer system proceeds in powers of two, and can be drawn in "dimensional" configurations called hypercubes. In a hypercubic diagram, the vertices in the cube for that dimension represent the nodes in the Transputer. A three-dimensional hypercube thus resembles a cube, with eight vertices—eight nodes. A 2D hypercube is a square with four nodes, a 1D a line with two nodes, and a 0D (a virtual 1040ST) a dot with one node.

Beyond the 3D hypercube, configurations become difficult to diagram. The 4D hypercube resembles a tesseract, or a theoretical three-dimensional "shadow" of a four-dimensional object, just as 3D objects cast 2D shadows. Looking like two cubes, one inside the other but tied at the vertices, a 4D hypercube has 16 nodes. Since it appears Atari's Transputer units will be 4 Mb, four-node, 2D hypercubes, four on one card together would represent the 4D hypercubic configuration.

You may have noticed a 1D, 2D, 3D, 4D cube has 2, 4, 8, 16 nodes, respectively, proceeding upward in powers of two. This way, each node can be addressed binarily so that the number of bits in the node number denotes the dimensional depth of the hypercube. Sixteen nodes, for instance, are numbered 1111 in binary—four bits, thus four dimensions. This hypercubic schematic concept for parallel processing is called the binary N-cube scheme, with N representing the arbitrary number of dimensions. The theoretical maximum node configuration for the T800 is a 12D cube with 4,096 nodes.

Shiraz Shivji explains why the

binary N-cube scheme was chosen: "For one thing, a lot of the other methods involve too many lines that need to be switched, and enormous quantities of hardware; and it seems to be quite expensive. We can get similar performance capabilities from using this RISC architecture from Inmos. One of the things that you come up against, again, with RISC architectures, is that you're reaching the limit of a sequential processing machine. The Princeton type architecture is running out of steam at 10, 12 MIPS [Millions of Instructions Per Second]—you're running real fast memories and running at real high clock speed, you get bogged down at 15, 18, maybe you can go up to 20 MIPS with gallium arsenide or some real fast ECL-type processing. It's very, very expensive to do it. So you have to look at other structures to allow you to go beyond that.

"We hope to eventually bring this type of technology down to the level of consumers. A parallel processing-type environment in the home is a very, very natural thing. You have processors doing one thing linked together, and acting in concert. Those kinds of things, within five to ten years' time, will be in almost every home."

You Haul 15 MIPS, and Whaddya Get...?

So just how fast is a T800 Transputer? Relates Shivji: "Let me give you some numbers, just to give you an idea of how these things stack up. That's about the only way you can tell. Some of the benchmarks that have been done are as follows, for a single T-800 Transputer: An Intel -286/-287 combination, their Whetstone benchmark, in Whetstones-per-second, single length, the Intel processor at 8 MHz will give you 300K. The National Semiconductor 32332, which is their latest version in production that is working, with a 32081 floating-point

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unit, at 15 MHz will give you 728K Whetstones-per-second. The 68020, with a 68881, with the 68020 at 16 and the -881 at 12 MHz, will give you a Whetstone of 755K.

"The Fairchild Clipper—there's a lot of talk about how powerful that RISC machine is—it's being used by a company called InterGraphic. At 33 MHz, it has a Whetstone figure of 2220K. The T-800, running at 20 MHz, has a number of 4000K."

How does that compare to the competition in terms of MIPS? Shivji continues: "Sun recently introduced the Sun 4, which is supposed to be a RISC-architecture machine, around 10 MIPS. But you run out of steam, and you can't do anything about it. You have to go to the next level machine that will run the same processor at a higher speed, for example. Then you'll need very fast memory, and everything that goes with it. The faster machines that you get nowadays put tremendous strain on the speed of the memory that you have to use. Even regular users of PCs are realizing you have -386s, -286s; people are actually talking about wait states. You see in advertising the zero wait states; you see that the speed you run memory at is a very important consideration. In our case, if you're running out of steam, if the operating system is written to take advantage of it, the hardware is there to take advantage of it,

you can put more processors and that can help.

"Typically, with the power of the total machine, you could put some kind of multiple processors, some kind of card that controls what goes from one place to the other, and you have somebody who does the switching and so on. Those kinds of things take up a lot of overhead in traditional architecture. In a Transputer, the four links that are available can concurrently run with the processing, processing can go on concurrently with the delivery and acceptance of data—which is a big advantage. Obviously that is why the power of the machine is much more linear, goes up in a linear fashion; I'm talking about a 10 MIPS machine, or 12 MIPS. Two machines will give you 20 or 24 MIPS; pretty much, you're not losing too many MIPS as far as the inter-processor communications and the mailbox, or whatever techniques you use to communicate between things. You have to set semaphores, and say, 'Okay, now you can come and take this.' All those traditional techniques for having a microprocessor share memory with another microprocessor, do not multiply the power by two. In the traditional way, it does improve the power, but not by the factor of the processor. It also reaches a curve, reaches an asymptote—which again depends on the scheme.

"In our case," continues Shivji, "it's all related to how you pose your problem. This is the case that's faced also

with machines like the Cray, and IBM—for example, the new IBM very large mainframe that has vectorization, and you have vectorizing compilers. A lot of scientific programs written in FORTRAN are nowadays written in such a way that the problems are broken down into the parallel processes that need to be done, into vectorization-type situations. There are a lot of real-world problems that lend themselves to breaking down into parallel processes."

Since there are very few working implementations of T800 architecture existing outside of corporate laboratories, very little software exists for it besides a few benchmarks and experimental programs. Atari would like to see some form of UNIX-like operating system run on its Transputer implementation, so that it might have a place in an Atari networking contention scheme alongside IDRIS—the new alternative operating system for the Mega ST.

Atari has therefore approached Perihelion Software—another British company—which is developing Helios, a UNIX-like OS described here by Shiraz Shivji: "We hope that this will become a standard operating system for the Transputer-type projects. It's a distributed operating system—multiprocessing, multi-user. It's sympathetic to Transputer architecture; it's familiar to UNIX users. It will look like UNIX, but it's not really UNIX.

"It has very similar things. You see, UNIX does not operate in the mode that tasks are split between different processes, and so on. The system overview is as follows: Multiple processes are allowed, and actually spawned. Message-passing is handled in the operating system. The client/server model is used. The process of protection is maintained. The user interface is going to be XWindows; there'll be a GEM driver, a GEM under XWindows, and a shell.

"Programming models," relates Shivji, "are as follows: You have traditional single sequential model, multiple-process, and parallel algorithms. Compatibility is MSDOS floppy format, of course—the ST provides that. [There's] UNIX-style hard disk format, UNIX C library, UNIX command subset. Language support is with C, FORTRAN, Pascal, BCPL, Lisp, and Occam. The development environment is assembler-linker, [and a] C compiler has just been developed for the Transputer. This Transputer was being pushed with Occam—which is quite a different language. It's very easy; I've seen some demos about how easy it is to spawn parallel processes. [Atari's Transputer] has a debugger, native mode, Atari ST environment, UNIX, MSDOS. That's the development environment."

In the client/server model, inter-process communication within the same system is identical to communication across a network. A client running a process initiated by a server several hundred miles away would use the same procedure as it would if the server were across the hall, or if the client were the server.

"For the traditionalist, who wants

to see PC-type stuff, it's possible to emulate the total PC environment at fairly high speeds. We have been doing some benchmarking—it looks like we can get more than AT speed capability for not very much more than an AT price—in the environment that we're talking about. Plus all this adept power that will get you somewhere else.

"What I'm talking to you about is a single-Transputer emulation. Again, emulating a complete environment does take a lot of computing resources. If you feel it's taking too much, you add another card to the Transputer, and that Transputer could be dedicated solely to doing the PC-emulation."

Getting a fully PC-emulative window to run in one corner of the screen requires one rather large, resolute screen. Several months ago such a high-res monitor was intended for use with the "TT" project; the monitor being discussed for this system appears to be the same one.

Although Immos produced some of the color graphics hardware for IBM's new PS/2, Atari has instead opted to create its own video processor, with its own 1 Mb of memory all to itself. Shivji describes what we should be seeing: "Video stuff is spectacular. There are four different modes, and one of the modes has 32 bits per pixel. Most of the modes are 8 bits per pixel, and there's a color look-up table. One of the modes that we think it'll be used for in its processing has 32 bits, of which 24 are actually displayed."

"Let me tell you this: This competes with any workstation that's out there in the marketplace, in terms of resolution. The chip that sits with this stuff, that does some of the video processing, is a bit-blit chip that is in design right now. We've been working on the project for quite a while, but we should be getting the parts before COMDEX."

"You can play great games," understates Shivji, "in the Transputer environment; now you have a lot more power than you ever had. I think one of the demos that you will see is, perhaps, three machines connected together through the links that are at 20 Mbits/sec, and then you're involved in a helicopter or a plane, and you're flying and seeing the other guy, and the other guy is seeing you. All this stuff is being done in real-time. You can have real interactive simulations. The whole idea is to be able to bring down this new level of computing architecture to the user."

From Megabytes and Blits to Nodes and Vectors

Assuming this project succeeds, Atari may be marketing the first-ever self-contained parallel-processing computer to run a modified UNIX-like operating system, and also be able to address virtual memory through pseudo-devices like a hard disk drive. It is a mighty gamble Digital Equipment reportedly passed up. Atari's Transputer system may sell for under \$5,000—still lower than a Macintosh

continued on page 326

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Interlink ST continued from page 163

are presented with a list of the available emulation types (.EMU suffix) and/or file transfer protocols (.TXF suffix) which will allow Interlink to load up special routines to handle many different terminal emulation modes and different file transfer protocols. On the down side, I have not seen any VT100 or any other emulation file outside of VT52 emulation, although Intersect has a list of emulator files that they state they are working on. On the file transfer side, things are much more promising and encouraging. Xmodem and Ymodem, and ASCII file transfers are standard with Interlink, with Ymodem Batch, and the recently introduced MULTIXY.TXF-Multi-tasking Xmodem/Ymodem file transfer. With MULTIXY.TXF loaded up and its Desk Accessory (IL-NMULTI.ACC) installed (yes, there was a catch!) you can invoke a lengthy file transfer, and then use the Execute Program facility to do a task in foreground while Interlink does the file transfer in background.

The Execute Program facility, like any other programmatically generated event, demands that you have enough memory to properly load and execute the requested program, and it should "behave" reasonably well so as to not do nasty things to your system. If you are doing a background transfer, Intersect has a few caveats in their documentation that you should pay heed to.

Another minor irritant: Interlink does its own timing adjustments in regards to inter-packet and inter-block timeouts during a file transfer, and unlike most other file transfers Interlink's error count is cumulative and does not reset upon presentation of a error-free block. This makes using a marginal-quality line a crap shoot with Interlink's file transfer protocols, and could result in very undesirable results especially when packet-switching networks get spastic. Por to use that old platitude—"Results may vary."

The Remote Facility gets high marks for its three levels of security control AND its lean and clean structure, which includes the ability to leave (and retrieve!) messages, upload and download, and to TEST the Remote Facility without requiring a second terminal—which is badly needed. Files uploaded and downloaded under low access can be routed into a separate folder to prevent someone from running amuck if you decide to put your system up with your hard drive up and running. High access allows you to do just about every kind of file maintenance, just stopping short of creating and making directories.

The Recorder File is something that should have been done for quite a while: capture what you type during a session and then turn around and replay it back, allowing you to capture a "model" session; save its contents and then replay the sequence as often as you need to, and with the side benefit of being able to set it to trigger off at a pre-determined time, when response

times may be better on a network or dialing up a single-line system in the middle of the night when every other sane person is asleep.

When you use the recorder, various options are set into motion: turning the recorder on and off, when to play a recorder file, its playback speed (Normal, the speed you typed the text in at, or Fast, with no time delays,) the Compare Length on which to trigger off your responses to what is stored in the recorder file, and the wait time between playback responses from the recorder file. Instead of having to sit down and create macros to scan a download directory or message base you can just do it once, and use playback. Honestly—it can't get much easier than this!

Other items of note: Interlink implements the "Clipboard" facility in its capture buffer and also includes the clipboard program that was blessed by Atari. Unfortunately, not too many other programs that I am aware of make use of the Clipboard; its inclusion is a nice recognition, but it seems somewhat useless right now. Another somewhat minor irritant: When you quit Interlink it does note if you made any configuration changes and asks for confirmation. Another nice touch, but when you finally leave Interlink it hacks your palette registers to the system default colors: black text on a white backdrop with a green desktop. Ironically, if you re-execute Interlink it restores your palette registers, but when you leave you are back to White/Black/Green.

Customer Support can be found on most of the major networks (with a VERY active Topic on GENIE's Atari RoundTable, and with die-hard users on Delphi and CIS) and thru Interlink's BBS number (813)-924-4590. As new file transfer/terminal emulation files are created and tested they will be uploaded to the nets: all you do is pay for connect time to fetch them; in essence, FREE. Upgrades to the Interlink main code will be announced by Intersect with registered owners being notified either by mail or thru the dealer network; no price for an upgrade was mentioned.

Summary. For its price; what you get is if it isn't now, it will be: The Best ST Emulator with the most going for it. While it's weak in terminal emulation right now, You still really can't go wrong with Interlink. And if you think that I'm overrating this product, I'd urge you to check out for yourself. So what are you waiting for?

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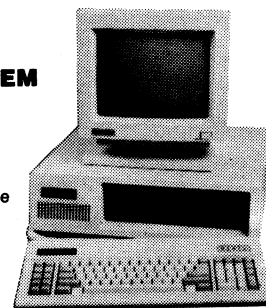
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DeskCart

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block number is subsequently deallocated, and made available for use by other programs. C was originated for use in true multi-tasking systems which require malloc to set up space in the system for program, variables, and data.

The ST's GEM division of TOS—a non-multi-tasking system—was programmed mostly in C, so it understands malloc and free...to an extent. DeskCart's programmers, who were experienced with multi-tasking and the terminology of the mainframe world, had to determine how to handle memory so that it didn't interfere with the main *.PRG application which, as on all single-tasking micros, hogs space.

John DeMar: "There are variables in the program itself—the bss segment is about 22K. The "block-start segment" is where any of your strings, constants, and any working variables are used in programming. It's not held anywhere in a file, because it's all initialized at run-time. [There's] the text segment, which has constants—and that's held in the actual .PRG file—and then there's bss, which is non-initialized data; then there's the actual program segment.

"[DeskCart] takes up, when you get right down to it, 80K of memory. Once you use one of the database functions, it allocates a 32K buffer. Even though it frees that up when it's done, we're back to that same problem:

other programs and the Desktop won't [notice] that. DeskCart will; and that's the time you have to use the database functions, or something else that'll see that 32K buffer. Fortunately, when you go use a free-RAM accessory, it won't show that as being free, even though it is. That's a bug in GEMDOS.

"Depending on the order," continues DeMar, "in which you boot the accessories, they may use up many different sizes of memory. The actual Desktop accessory loader, that's built into the operating system, will allocate different-size buffers depending on the phase of the moon, it seems. If you dump the memory allocation tables—I have a little program which dumps those—it'll show you all the sections of memory that are free, and their sizes. They're not all continuous, so they're not all going to be shown in a free-RAM indication, but they're all free to use. You could get 200K free back from GEMDOS, and you'd [then] have 500K free—but the rest of them are all different segments that can't be seen by malloc. It's really weird."

A GEM application generally uses what are called "resource files," which are coded graphic descriptions of how control elements are to be placed on the screen, saved to disk under the extension *.RSC. On the DeskCart disk is its own resource file, which is nearly 32K long and is loaded into memory at boot time. Recently, programmers have chosen to fool the ST's GEM, and integrate resource files directly into their programs.

DeskCart's programmers chose to keep its *.RSC file external to the cartridge. John DeMar explains why: "Two reasons: One, there's definitely going to be a market for this in other languages—German and French are the major ones. We didn't want to have to make separate versions of the ROMs for each of those. The other reason is, if we wanted to put the resource in ROM, we had to do one of two things: make it less functional, because you wouldn't be able to fit everything in; or go to 128K of ROM instead of 64K—and then we would have to have cost over \$100. \$99.95 is the Secret Price; trying to sell something above that gets pretty itchy, especially when it's not a stand-alone application. If we had done it with 128K, it would've cost at least 150 bucks, the way the EPROM and ROM prices are right now."

QMI's solution was to rig a way, from within DeskCart, to clean up some of the leftover space forgotten by GEMDOS. "One of the biggest problems," explains DeMar, "was to make DeskCart work in all three resolutions, and have it survive a resolution change from low to medium. There's more problems involved with that than just the resource, regardless of whether you put the resource in memory or outside of memory."

With successive resolution changes, the system will eventually run out of memory. "The reason why," claims DeMar, "is not because of the resource [file]; it's because of GEMDOS' malloc memory allocation routine. When

[GEMDOS] changes resolutions, it doesn't know enough to free up those blocks that were already used. So it leaves everything allocated. When you load a resource, and the AES asks for a hunk of memory to go put that resource in, the memory allocator gives it a new hunk, and doesn't know that it could put it in the old hunk.

"To fix the problem with malloc, we kept pointers to our own blocks for use with various things. We free them up ourselves upon resolution changes. That did help the problem a little bit. It doesn't steal as much memory when you change resolutions as it would otherwise. It still takes some—I think, 40K—every time you change resolutions, but it would take a lot more if we hadn't tried to do some of those tricks.

"Even in high resolution, regardless of changing resolutions, if you allocate a buffer with the old version of the ROMs, then de-allocate it, and you go back and ask for, say, a 32K buffer, and there may be a chunk of memory previously allocated for that size, the operating system won't see it, and it won't give it to you. So you keep asking for little buffers, and it'll keep eating out of your main block of memory, and all these little pieces will be scattered all over the place.

"In DeskCart," continues DeMar, "there is a memory allocation handler that sees all those little pieces, and does a best-fit when you ask for a piece of memory, regardless of what it's for. It

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**Atari ST Outlook
continued from page 324**

II—and production may begin in March of 1988.

So are we witnessing another brief sparkling moment in the history of experimentation, or is the future truly being created at Atari? Could we, four years from now, in these very pages, be using such concepts as internode linkage and vector processing as casually as we use bit-blits and GEM event pipelines today?

Shiraz Shivji's answer: "I am definitely seeing a trend in the industry; this is just the first exploration of doing those things. In the US, we've been very traditional. You read any of the technical journals, you look at what's happening in the industry—everybody's building a -386 box, for example, at a higher clock rate, and with caches, and so on; or everybody's building a 68020-type box that runs UNIX—those are the traditional paths that people have been following in the US. There really has been not much of a situation where companies have been taking risks and exploring higher architectures that will give them more of a return. Instead of an incremental increase in performance—which is what we have been getting—I think it is time to get a quantum jump, which is possible at this stage, in terms of technology being available."

In order to produce the next great leap in technology, still packaged attractively for the consumer, don't Atari's developers need more time?

Shivji: "I hope it's a positive thing; a little bit of pressure on us to get it out quickly will certainly help. We're using a lot of outside resources; these are really fine people who have a lot of experience and a lot of knowledge. That, of course, is very, very nice. Yes, there is pressure; on the other hand, it's very healthy. It also shows to the world, I think, that we've not been sitting idle. We've been looking at new approaches. We want Atari to be associated with being able to produce very high technology at the right price."

We've heard the fanfare before. This time, we can expect a parade to follow. A year and a half of speculation, disappointment, reorganization, and concentrated effort may finally lead to a breakthrough. Yet there will be skeptics who will gladly withhold judgment until that breakthrough shakes the ground beneath them, and produces a tangible product. I'll have a special reserved statement, "I told you so," ready to be broadcast at the first signs of a real rumble.

This is a time for the Atari enthusiast not to be passive, sit back, and gripe about all the unfulfilled Atari promises, and all the projects which never culminated into something that would make the old technology a nanosecond or two faster. This is a time for us to lend Atari our support. We must be the resolute ones. After all, we're all the advertising Atari has.

Your comments are welcome on the Shopper's C*SIX special interest group on the Delphi network, as well as Delphi's Group Atari. We'll see you there. ●

DeskCart continued from page 326

doesn't fix the malloc for all programs, but just for DeskCart itself. So when DeskCart asks for a 32K buffer to do something—like format a disk—and it gives it back, the next time it needs a 32K buffer it'll find that chunk and put it in there. The operating system won't do that."

As stated earlier, DeskCart's cartridge has 64K of EPROM (erasable/programmable ROM) instead of the 128K which is the maximum the ST can recognize. Since the DeskCart code itself is actually longer than 64K, some of the code "overflowed" to the included disk. The Calculator, thus, became an external accessory.

"There's a reason why it ended up there," confesses DeMar. "We had specified a calculator that was going to be even more sophisticated than that one, and when we came down to it, and I started squeezing all the code the guys had given me, I still couldn't fit the calculator in. At one time, with the 64K in there now, it would've been almost 100K, if you can believe that."

"I spent weeks just rewriting their codes, to bring it down to a lot smaller size. Then it was still over 64K, and I still wanted to put a couple more things in; so I had to make a decision on what to pull that I knew people would replace with another [similar] accessory, or not even use at all. The biggest chunk that I could take out to fit that criteria was the Calculator."

The Calculator actually boots in as its own separate accessory, that won't work without DeskCart. There's a little messaging scheme so that DeskCart can hear another accessory screaming, 'Help, help, I'm here!' Once it does that, it installs its name, and hooks everything that it needs to hook into that accessory."

"We could've made a stupid four-function calculator," admits DeMar, "but that would've been no big deal. We decided not to go that way, and leave the full-function calculator external. I wish I could think of a more exotic reason why we did that. If the ROM prices had stayed down—they've been going up and up—we might have been able to do it in 128K."

The casual DeskCart user may discover quite by accident that she can exceed the four-window limit once unyieldingly imposed by GEM. How did QMI, as it were, break the window barrier? States DeMar, "The Desktop itself artificially limits you to four windows. I don't know why. It's really dumb, because GEM's internal workings allow for eight windows; and the Desktop itself, or the background desktop of a program, is considered as window 0, and it can go through to window 7. So real windows, with all the gadgets on them, have a maximum in GEM of seven."

"Some programs don't check to see if all the windows are in use. Word Writer is one of those programs. If you open up a whole bunch of DeskCart

things, and you start opening documents, once you've opened seven windows, and you ask the program—not DeskCart—to open up another window, it says, 'Okay!' and it doesn't get a window, because GEM says, 'I don't have any more left.' It doesn't do any error-checking, and this program [Word Writer] blows up. DeskCart itself looks, and says, 'You don't have any windows left over. Please close another window before opening it.'"

One may find DeskCart has more ways of fooling GEM than Bugs Bunny has of Elmer Fudd. The initialization routine BOOTCART.ACC, for instance—just 473 bytes long—contains just enough code to put a dialog box on the screen saying the cartridge isn't plugged in, or else passes control to the cartridge. Normally, however, an ST cartridge boots by itself without such a bootstrap.

DeMar explains "the reason that the little booter is there: [The authors] had documented how they could set a bit in the header of the cartridge that could tell [the OS] that it contains accessories. It doesn't work. I know they didn't fix that in the new ROMs; I guess it doesn't matter, since nobody's going to use it anyway since it doesn't work with the old ROMs. The one thing that makes DeskCart small and makes that accessory small, is that I rewrote all the bindings for GEM myself in assembly language. That was one of the things that brought DeskCart down in size."

"[BootCart] has enough routines to call up form__alert to get that [dialog

box] up there if it's not plugged in; otherwise it makes a stupid jump to the cartridge, and it enters the cartridge at the point that normally would have been entered if it were run as an accessory from a disk. If it were "DeskCart.ACC," and it had a disk-based accessory [slot], that would be the place it would jump into. Being a cartridge application, it can't run that way because the cartridge itself is ROM, and you can't put your variables in there. If it was run off a disk, it expects that you're going to be able to put your variables right after the program. Normally when a program loads it in memory, the program precedes the memory it allocates for variables—the bss segment.

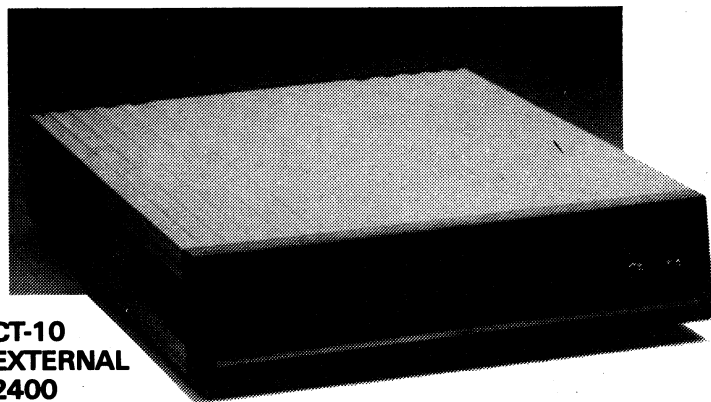
Thus the compromise: an application set recognized by the OS both as an accessory and a cartridge.

"This is written in Megamax C," continues DeMar, "with a lot of assembly language; but Megamax lets you make either an application or an accessory—nothing about cartridges. So I had to write my own set-up code for Megamax to work with cartridge accessories. It has to allocate its own storage for all those variables, and copy them, along with the constants, and initialize them...anywhere. It has no idea where the variables are going to be."

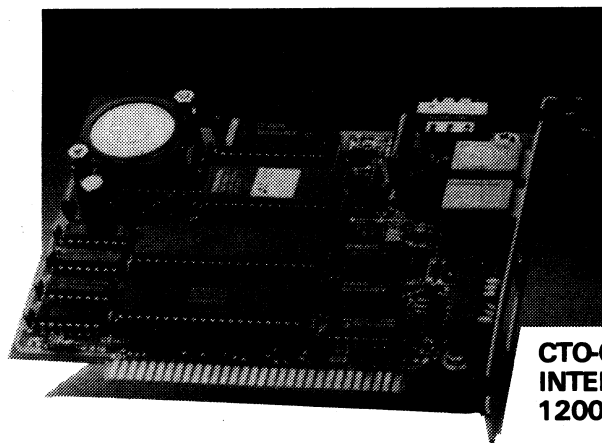
The engineering behind these utilities is evidently more complex than the turn of a wrist; yet like the study of human anatomy, it can be fascinating, sometimes embarrassing, but always spellbinding. ●

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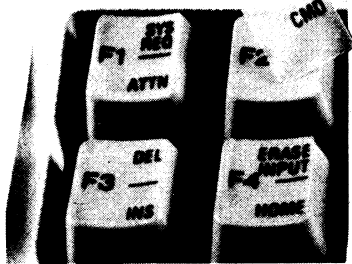
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The Expander

Reviewed by John Pilge

The Expander is an operating system on a computer chip. It is designed to replace the Atari OS chip in the Atari XL/XE computer.

Since you must desolder the Atari OS chip in the Atari XE and some models of the Atari XL, it would be wise to put in a chip socket for the Expander chip. You may want to replace it sometime.

The Expander is designed for Atari XL/XE computers that have had the memory expanded to 256K or up to 512K. While some Disk Operating systems will treat your extra memory as one RAMdisk, Expander allows up to four RAMdisks (double or single density).

You also have the ability of choosing a RAMdisk as drive #1. Thus, you can boot from any RAMdisk and run a program from RAMdisk that needs to run from drive #1.

The Expander has commands (COPY DISK, FORMAT, BOOT DISK, etc.) that you can access from almost any program. This is valuable should your program lock-up or if you want to alter the RAMdisks without going to DOS.

If you are using a word processor, such as Bank Street Writer, you could have a spelling checker on RAMdisk #2 and a letter file on RAMdisk #3. In the middle of Bank Street Writer, you can go to the Expander commands by pressing HELP and START at the same time, and change RAMdisk #2 to Disk #1 and boot the spelling checker to use on any file from RAMdisk #3.

But, if the program uses the function keys, it will not likely surrender to the Expander commands.

Also, games and other commercial programs are not designed to be copied to a RAMdisk nor do they always allow you to break out of a program.

When programming, Expander is even more useful. The key response is faster using the Expander OS. The cursor is faster and lets you type faster.

All BASIC languages work with Expander. With the added commands of Expander (DISK COPY, FORMAT, BOOT DISK etc.) it is a perfect companion to Turbo BASIC.

Expander even has one touch LOAD and SAVE commands for BASIC and Assembly.

If your Disk Operating System (DOS) doesn't support a RAMdisk (Atari DOS

2.0 and SmartDOS for example) the Expander fools the DOS into seeing the RAMdisks as Drive #2, Drive #3 or however you have it configured. Remember that Atari DOS will only recognize two drives unless modified.

DOS XL (by OSS) does not work with Expander. You can still copy to a RAMdisk and get a directory of a RAMdisk but you cannot LOAD or RUN a program off a RAMdisk from BASIC using DOS XL.

The Expander acts as a translator. You can run older third party software such as the cartridge, Protector II from Synapse. But you cannot use any software from Electronic Arts. You will only get the message, "REMOVE CUSTOM O.S."

Another caution. If the kit you used to expand your Atari Memory was made by Newell Industries, it will conflict with Expander. Things work fine from BASIC, but you cannot boot a RAMdisk or load a binary program.

The Expander is most useful for programmers. For non-programmers, it is still useful, but not as much fun.

The Expander is available from Synergy Concepts, 1404 Brewerton Drive #354, Sacramento, CA 95883. ●

Getting The Most continued from page 366

I can go to the store and put my sticky little hands on one. Which brings up:

Tillery's Universal Computer Law of Improbabilities: Don't base your decision on "Vaporware." Don't listen to what "might be" or what "is planned" or "what is in the works and will be released next April," etc. It often doesn't materialize; or, if it does, it is years late. Worse, it is, all too often, a marketing ploy to see if there is any interest in the product. This phenomenon is called "Vaporware" in the industry. When I bought my C-64 in 1983, there was soon to be an "Apple emulator" for it. As far as I know, you still can't actually buy one, but by now, who would want one? You can buy an Apple clone cheaper. There are various emulators for the Amiga, but you can often buy a "clone" for the price of them...so:

Tillery's Law of Comparative Compromises: Buy what you want. Don't count on "emulators." At best, they are poor substitutes for the real thing and are often as expensive. As soon as you buy something, follow:

Tillery's Special Law of Repentancy: Whatever you buy, particularly when it comes to peripherals, will be advertised in the *Computer Shopper* cheaper and better within six months of your purchase. So don't get caught up in the trap of waiting for the best deal or a more powerful product—you'll never get there.

Now for the specific question about the 128. There is no operational difference between the 128D and the C-128. The 128D is prettier and you

can put the keyboard in your lap, but it operates and does exactly the same as the C-128. As to differences, I'll let you decide if they are "Important" (they are not for my purposes but would be if I were deeply into graphics. The 128D has 64K of RAM for the 80 column display instead of the 16 in the C-128. This simply means that when suitable software becomes available to take advantage of it, you can have a more impressive color display in 80 column mode with the 128D. Another change is that the 128D disk drive, being internal, doesn't have external dip switches like the 1571 drive that you use with the C-128. This is no big deal since you aren't likely to change the internal one if you buy a second drive. You'll change the external one and it, being a regular 1571 drive (like you would buy with the C-128), has external dip switches. When you are comparing prices, however, note that a 128D comes with one disk drive included in the price. The C-128 does not.

Tillery's Hypothesis of Subjective Irrationality for Home Computers: For your own use, and considering Tillery's Rules 1, 2 and 3 as well as Tillery's laws, there is no better choice for a home computer than the C-128 (read 128D if you prefer). It has all the wonderful bright colors and graphics; games, sound and educational features of a C-64 but with the serious additional productivity capabilities of the more powerful 128. For example: I don't think there is a better word processor on the market than the one I am using on the C-128. I use and teach two of the top MSDOS word pro-

cessors on my AT clone, but when I start to write anything short of a book, it's back to the C-128. The MSDOS word processors are more powerful but have power features that most of us will never use at the expense of neat little features like "on screen formatting," which is rare in MSDOS word processors, and ease of use. Useful power like an outliner, thesaurus and dictionary is included. Finally, the CP/M mode in the 128 makes an excellent bridge to the world of IBM when and if the time comes.

So, after making a short story long, and thoroughly confusing the issue, let me say clearly that my move would be, and has been, to buy the C-128 or 128D, whichever you can get the best deal on, for a home computer (except when rule 3 applies).

That said, let me cop out with this: In my office, as I sit at my C-128 writing this, there is, at my left arm, an IBM AT clone. So following the:

Tillery's Theory of Applied Vacillation: I couldn't decide...so I bought both.

For more information on Dfile 128, WordFile 128, and the un-named spreadsheet, contact Michaelsoft, 4821 Harvest Ct., Colorado Springs, CO 80917. Blitz! is a product of Skyles Electric Works, 231 E. South Whisman Road, Mountain View, CA 94041. CP/M is from Digital Research Inc., PO Box 579, 160 Central Avenue, Pacific Grove, CA 93950. dBase II is from Ashton-Tate, 10150 West Jefferson Blvd., Culver City, CA 90230; 1-800-437-4329. GEOS is by Berkeley Softworks, 2150 Shattuck Ave., Berkeley, CA 94704. ●